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are three colors, the third is commonly white, — the union of the other two, as it were. A fine illustration of this is seen in the showy moccason-flower (*Cypripedium spectabile* Swartz.). The snow-white petals spread above the inflated lip of as perfect a white melting into pink, which in turn, deepens into purple in front; while, drooping into the cavity, depends the singular petal-like sterile stamen of a pale lemon-color blotched with tawny spots. Another elegant example of this is presented by the *Calopogon pulchellus* R. Br., the club-shaped hairs in the beautiful beard of which are pure white, bright yellow, and rich purple. The white is distributed, if we may use the expression, into yellow and purple. — HENRY GILLMAN, *Detroit*, *Michigan*.

THE LIANIS OR WOODY CLIMBERS of the Isthmus, form, as is well known, entangled obstructions in the forests, which can be penetrated only by aid of the axe or *machete*. M. Lévy, a botanical traveller in Nicaragua, sends to the "Bulletin of the Botanical Society" of France (Nov., 1869) an interesting account of them. The stems send out aerial roots freely, many of which reach the ground, when they enlarge in diameter and form new trunk-like supports. When cut in two the lower end of the severed stem sends down a root to rëestablish its connection with the ground. M. Lévy, finding one in this condition from which hung roots a foot long, cut it off anew; two days afterwards it had produced new roots of the same length. Cutting it again it promptly made new roots, but more slender ones. He repeated the operation up to the eighth time, but the new roots were now so slender and feeble that he desisted. The plant was a species of *Bignonia*.

JAPANESE SEA-WEEDS. — At a recent meeting of the Royal Academy of Amsterdam, a collection was exhibited to illustrate the care taken by the Japanese in applying to beneficial purposes the natural products of their country. The collection consisted of sixteen species of algæ which are useful for food or other purposes, together with fabrics manufactured from some of them. Several of the species were altogether new; in other instances the application was entirely novel. — *Quarterly Journal of Science*.

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ZOOLOGY.

A NEW INSECTICIDE. — M. Cloez, who is engaged at the garden of the Paris Museum, has invented what he considers a complete annihilator for plant-lice and other small insects. This discovery is given in the "Revue Horticole," with the endorsement of its distinguished editor, E. M. Carrière. To reduce M. Cloez's preparation to our measures, it will be sufficiently accurate to say, take three and one-half ounces of quassia chips, and five drachms of stavesacre seeds, powdered. These are to be put in seven pints of water, and boiled until reduced to five pints. When the liquid is cooled, strain it, and use with a watering-pot or syringe, as may be most convenient. We are assured that this preparation has been most efficacious in France, and it will be worth while for our gardeners to experiment with it. Quassia has long been used as an insect-destroyer. The stavesacre seeds are the seeds of a species of larkspur, or Delphinium, and used to be kept in the old drug stores. Years ago they were much used for an insect that found its home in the human head, but as that has fortunately gone out of fashion, it may be that the seeds are less obtainable than formerly. The stavesacre seeds contain Delphine, which is one of the most active poisons known, and we have no doubt that a very small share of it would prove fatal to insects. — *Scientific Opinion.*

FAUNA OF ROUND ISLAND. — The remarkable discovery has been made by Sir H. Barkly, Governor of Mauritius, of four species of snakes and several species of lizards, in Round Island, a small island twenty-five miles from Port St. Louis, and separated by a sea only four hundred feet deep, no animals of that description being natives of the Mauritius. The flora was also found to be to a great extinct specifically distinct. — *The Academy.*

POSITION OF THE BRACHIOPODA IN THE ANIMAL KINGDOM. — For some time past the writer has had reasons for believing that the Brachiopods, with the Polyzoa, had greater affinities with the worms than with the mollusks. He has studied attentively *Terebratulina* and *Discina* as well as their early stages, and in all points of their structure interprets articulated characters, and not molluscan characters. Without entering into particulars at this time, he would state that in the structure of the shell he finds the greatest resemblance to the shell of crustacea, both as regards the peculiar tubular structure, and the scale-like appearance, and its chemical composition. In *Lingula*, while the carbonate of lime amounts to only six per cent., the phosphate of lime amounts to forty-two per cent.

The horny setæ which fringe the mantle are remarkably worm-like. In worms the bristles are enclosed in muscular sheaths, while in other articulate animals the hairs are simply tubular prolongations of the epidermal layer. In the Brachiopods these bristles are secreted by follicles and are surrounded by muscular fibres, and are freely moved by the animal. The structure of these setæ differ but little, if at all, from those of the worms.

The lophophore with the cirri is to be compared to similar parts in the tubicolous worms, and the mantle which covers and conceals their arms, is to be compared to the cephalic collar, as seen in Sabella, for instance, where we find it split laterally, and a portion reflected. If this were greatly developed so as to cover the expanded fronds of cirri, we should recognize quickly the relation between the two.

Dr. Gratiolet has compared the circulatory system of the Brachiopods to that of the crustacea, and Burmeister has shown a resemblance between the respiratory apparatus of certain cirripeds and that of Lingula.

In the reproductive system there is a close similarity existing between the oviducts of Brachiopoda, with their trumpet-shaped openings and, similar organs in the worms.

In the little knowledge we have of their embryology, the strongest proofs exist of their affinity with the worms. Lacaze-Duthiers figures the embryo of Thecidium, and it is a little animal with four segments. Fritz Müller figures an early stage of Discina, and we have recalled to us a positive articulate and worm-like character. From the body of this embryo, prominent bristles project. Smitt figures the same in the embryo of Lepralia, wherein he describes six bristles that appear locomotive; and Claparède figures the embryo of Nerine, a worm, in which we find similar bristles projecting from the body. In this connection it is interesting to note that in the winter eggs, or statoblasts, of Polyzoa we have a relation to similar characters among the lower crustacea, the ephippia of Daphnia, and the winter eggs of Rotifers, for example.

Leuckart places the Polyzoa with the worms, and the close affinity of the Polyzoa with the Brachiopoda is now freely admitted, and we now recall those peculiar worms, or early stages of them, which so strongly resemble in almost every essential point of their structure the hippocrepian Polyzoa.

As many of the foregoing points need ample illustration, and as the writer has in preparation a memoir on the subject, he will now only call attention to the facts supporting these views, evolved from the study of living Lingulæ. It is but justice to state that six months previous to the observations made on Lingula, he had come to conclusions herein expressed, and had freely argued it with his colaborators.

He saw the necessity of examining Lingula, however, before advancing these views, and for this sole purpose had visited North Carolina in company with Dr. A. S. Packard, jr., who with his observations on the worms and crustacea of that region yet found time to follow the writer, step by step, in his studies of Lingula, and was deeply impressed by the disclosures there made. His sincerest gratitude is due Dr. Elliott Coues, U. S. A., and Major Joseph Stewart, U. S. A., commandant at Fort Macon, North Carolina, for their constant aid and sympathy in furtherance of the object of his visit there.

After nearly a week's fruitless search, Lingulæ were found in a sand shoal, left at low tide. They were found buried in the sand. The peduncle, which was about six times the length of the shell, being encased in a *sand tube* differing in no respect from the sand tubes of neighboring annelids. In many instances the peduncle was broken in sifting them from the sand, yet the wound was quickly healed and a new sand-tube promptly formed. When placed on the surface of the sand they were noticed to move quite freely, by the sliding motion, in all directions, of the dorsal and ventral plates, aided at the same time by the rows of setæ or bristles, which swung back and forth like a galley of oars, leaving a peculiar track in the sand.

The peduncle was hollow, and the blood could be seen coursing back and forth in its channel. It was distinctly and regularly ringed, and presented a remarkably worm-like appearance. It had layers of circular and longitudinal muscular fibre, and coiled itself in numerous folds or unwound at full length. It was contractile, also, and quickly jerked the body beneath the sand when alarmed.

But the most startling discovery in connection with this interesting animal was the fact, that its blood was *red.* This was strongly marked in the gills, which were found in the shape of a series of rows of simple lamellæ, hanging from the internal surface of the mouth; thus proving the correctness of Vogt's observations from alcoholic specimens. At times the peduncle would become conjested, and a deep rose blush was markedly distinct. The sexes were distinct.

The writer believes the Brachiopods to be true articulates, having certain affinities with the crustacea, but properly belonging to the worms, coming nearest the tubicolous annelids. They may better be regarded as forming a comprehensive type, with general articulate features. Possibly they have affinities with the mollusks, through the homologies pointed out by Allman as existing between the Polyzoa and Tunicates.

It is interesting to remember that Lingula, though one of the earliest animals created, has yet remained essentially the same through all geological ages to the present time. — EDWARD S. MORSE.

Fig. 76.

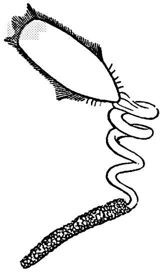

Fig. 77.

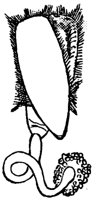

Fig. 78.

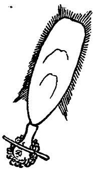

Fig. 76. Peduncle perfect, retaining a portion of the sand tube.
Fig. 77. Showing the valves in motion; the peduncle broken and new sand case being formed.
Fig. 78. Peduncle broken close to body and sand case being formed.

THE RUBY CROWNED WREN. — In reply to Mr. Allen's question, I may state positively that, according to my experience, the adult fertile female is "ruby-crowned" like the male. She is perhaps a trifle smaller, not quite so brightly colored, and with the flame-colored patch possibly of a little less extent; but she cannot be distinguished from the male with certainty, except on dissection, and even then it is not always easy to determine from slight inspection, unless the organs are enlarged in functional activity. The barren or sickly female may possibly not acquire the ornament. Birds of both sexes lack it for at least a year; whether they breed or not with plain heads I do not know. These come along in spring in the rear of the mature birds; they are most abundant at the time when the latter are about leaving. — ELLIOTT COUES.